

## 60V N-Channel Power MOSFET

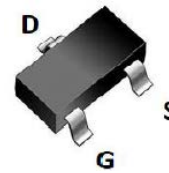
### DESCRIPTION :

- Excellent  $R_{DS(ON)}$
- Low Gate Charge
- Halogen-free
- Pb-Free Lead Plating
- RoHS compliant
- ESD Protected: 2K
- AEC-Q101 Qualified

$V_{DSS}$	60V
$I_D$	0.8A
$R_{DS(ON)_MAX}$ @ $V_{GS}=10V$	577m $\Omega$

### TYPICAL APPLICATIONS :

- Load Switch
- PWM Application
- General Automotive Application



SOT-23

### MAXIMUM RATINGS (at $T_C = 25\text{ }^\circ\text{C}$ , unless otherwise specified)

Characteristic	Condition	Symbol	Value	Unit
Drain-Source Voltage		$V_{DSS}$	60	V
Gate-Source Voltage		$V_{GSS}$	$\pm 20$	V
Continuous Drain Current	$T_A=25^\circ\text{C}$ $T_A=100^\circ\text{C}$	$I_D$	0.8 0.5	A
Pulsed Drain Current		$I_{DM}$	Refer to Fig.4	A
Power dissipation	$T_A=25^\circ\text{C}$ $T_A=100^\circ\text{C}$	$P_D$	1.0 0.5	W
Junction & Storage temperature Range		$T_J, T_{STG}$	-55~+150	$^\circ\text{C}$

### THERMAL CHARACTERISTICS

Characteristic	Condition	Symbol	Value	Unit
Thermal resistance,	Junction to Ambient	$R_{\theta JA}^{\textcircled{1}}$	211	$^\circ\text{C}/\text{W}$
		$R_{\theta JA}^{\textcircled{2}}$	153	

#### Notes:

- ①.  $R_{\theta JA}$  is measured with the device mounted on a minimum recommended pad of 2oz copper FR4 PCB.
- ②.  $R_{\theta JA}$  is measured with the device mounted on a 1inch<sup>2</sup> pad of 2oz copper FR4 PCB.

**ELECTRICAL CHARACTERISTICS (at  $T_J = 25\text{ }^\circ\text{C}$ , unless otherwise specified)**

Characteristic	Symbol	Min.	Typ.	Max.	Unit
Drain-Source Breakdown Voltage VGS = 0V, ID = 250uA	$V_{(BR)DSS}$	60			V
Zero Gate Voltage Drain Current VDS = 60 V, VGS = 0 V	$I_{DSS}$			1.0	uA
Gate-Source Leakage Current VGS = $\pm 20$ V, VDS = 0V	$I_{GSS}$			$\pm 10$	uA
Gate-Source threshold voltage VDS = VGS, ID = 250uA	$V_{GS(th)}$	1.1	1.5	2.0	V
Drain-Source On-State Resistance VGS = 10V, ID = 0.3A VGS = 4.5V, ID = 0.2A	$R_{DS(on)}$		577 650	750 845	m $\Omega$
Gate Resistance f=1MHZ	$R_g$		15		$\Omega$
Input capacitance f=1MHz, VDS=30 V, VGS=0 V	$C_{iss}$		55		pF
Output capacitance f=1MHz, VDS=30 V, VGS=0 V	$C_{oss}$		12.2		pF
Reverse transfer capacitance f=1MHz, VDS=30 V, VGS=0 V	$C_{rss}$		6.8		pF
Total Gate Charge VDS= 30V, ID= 1A, VGS=0 to 10V	$Q_G$		1.9		nC
Gate to Source Charge VDS= 30V, ID= 1A, VGS=0 to 10V	$Q_{GS}$		0.5		nC
Gate to Drain Charge VDS= 30V, ID= 1A, VGS=0 to 10V	$Q_{GD}$		0.3		nC
Turn-on delay time VDD=30 V, VGS= 10V, ID= 0.3A, $R_{GEN}=3\Omega$	$t_{d(ON)}$		1.1		ns
Rise time VDD=30 V, VGS= 10V, ID= 0.3A, $R_{GEN}=3\Omega$	$t_r$		2.2		ns
Turn-off delay time VDD=30 V, VGS= 10V, ID= 0.3A, $R_{GEN}=3\Omega$	$t_{d(OFF)}$		6.7		ns
Fall time VDD=30 V, VGS= 10V, ID= 0.3A, $R_{GEN}=3\Omega$	$t_f$		8.9		ns

## Body Diode

ELECTRICAL CHARACTERISTICS (at  $T_J = 25\text{ }^\circ\text{C}$ , unless otherwise specified)

Characteristic	Symbol	Min.	Typ.	Max.	Unit
Diode Forward Voltage $V_{GS} = 0V, I_S = 0.3A$	$V_{SD}$			1.2	V
Maximum Continuous Body Diode Forward Current	$I_S$			0.8	A
Maximum Pulsed Body Diode Forward Current	$I_{SM}$			3.0	A
Diode Reverse Recovery Time $I_F = 1A, di/dt = 100A/\mu s$	trr		16		ns
Diode Reverse Recovery Charge $I_F = 1A, di/dt = 100A/\mu s$	Qrr		7.3		nC

Typical Performance Characteristics

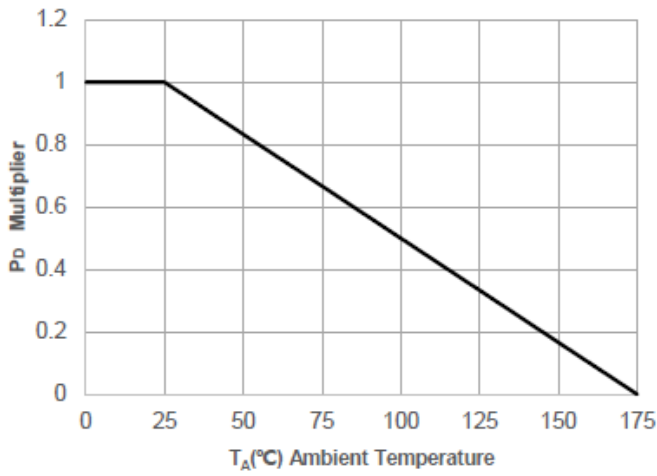


Figure 1. Power De-rating

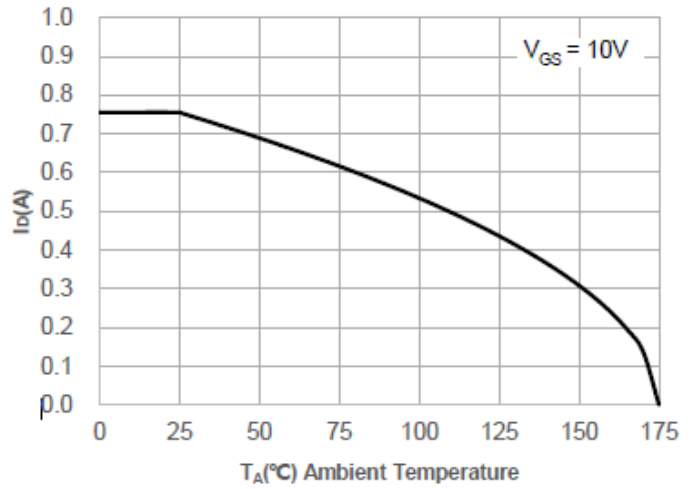


Figure 2. current De-rating

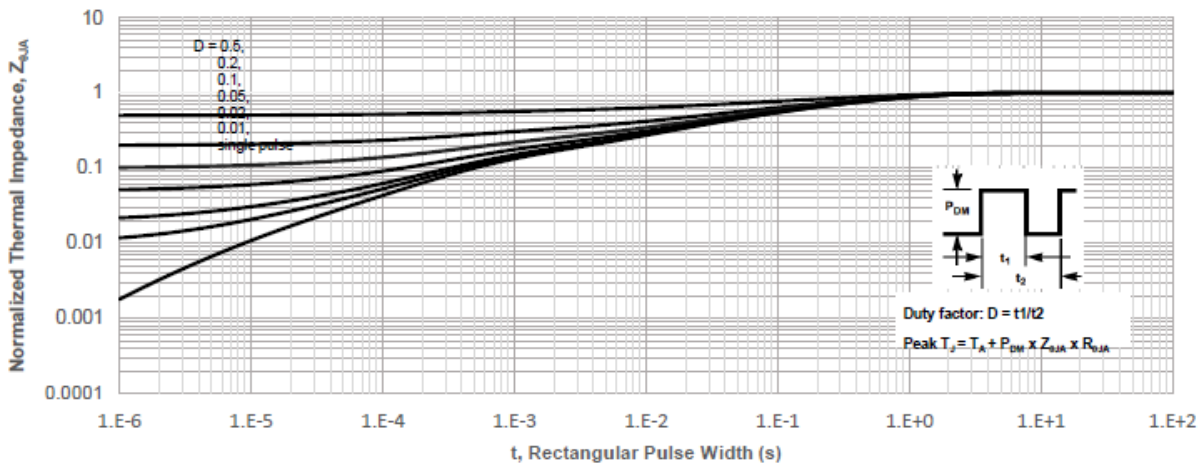


Figure 3. Normalized Maximum Transient Thermal Impedance

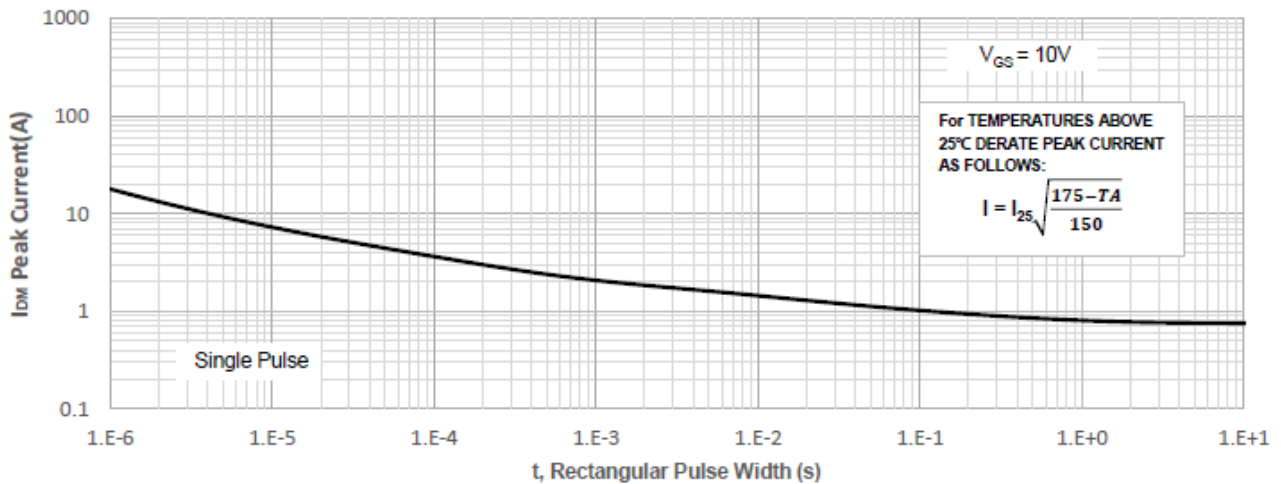


Figure 4: Peak current Capacity

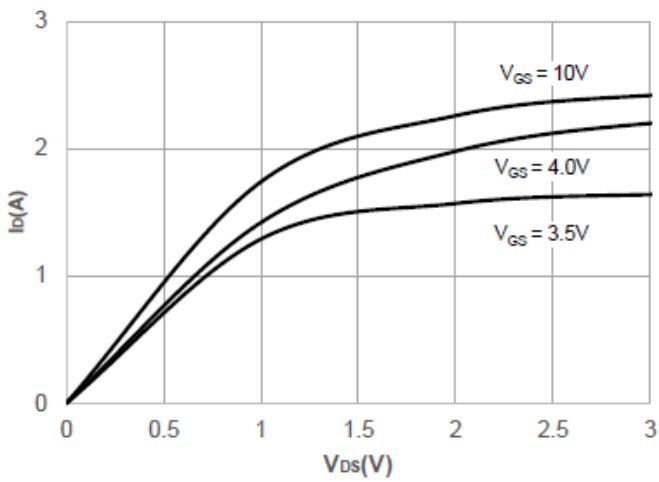


Figure 5: Output Characteristics

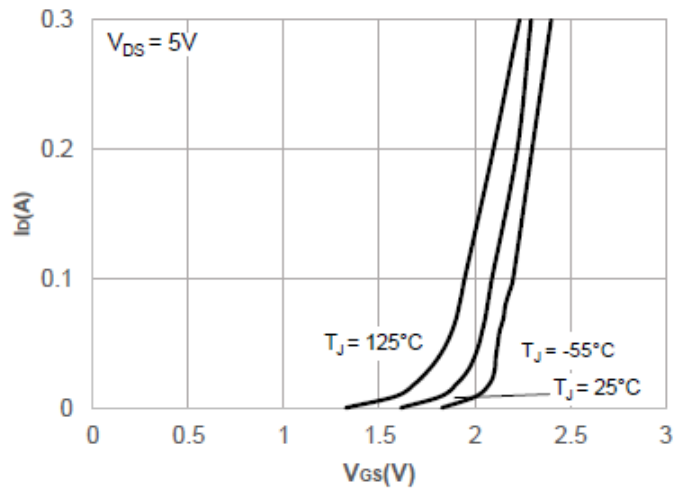


Figure 6: Typical Transfer Characteristics

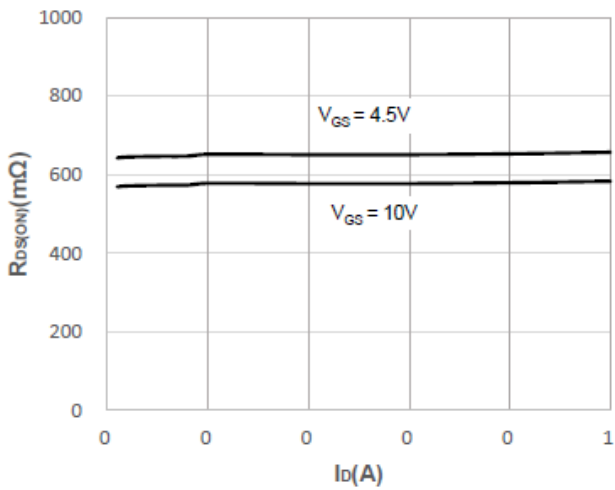


Figure 7: On-resistance vs. Drain Current

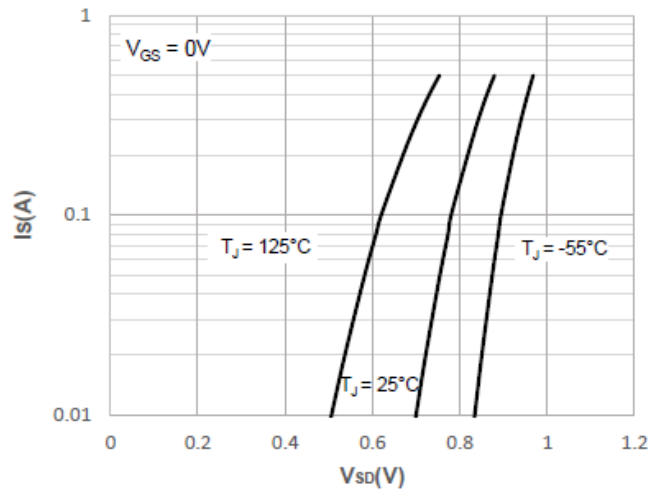


Figure 8: Body Diode Characteristics

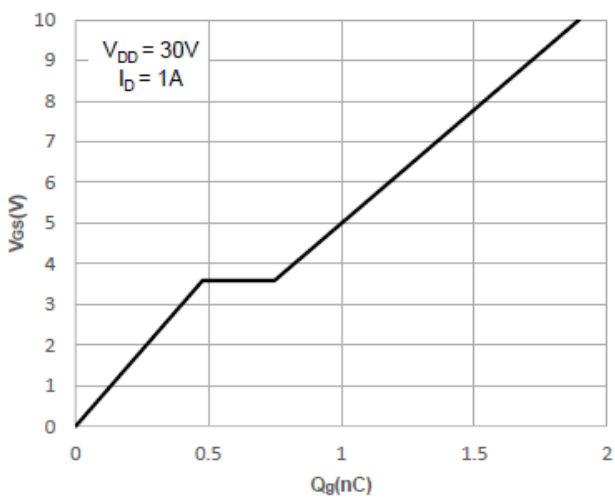


Figure 9: Gate Charge Characteristics

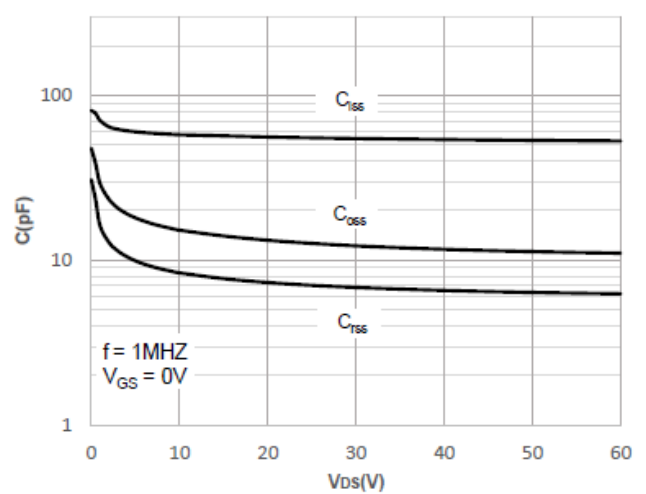


Figure 10: Capacitance Characteristics

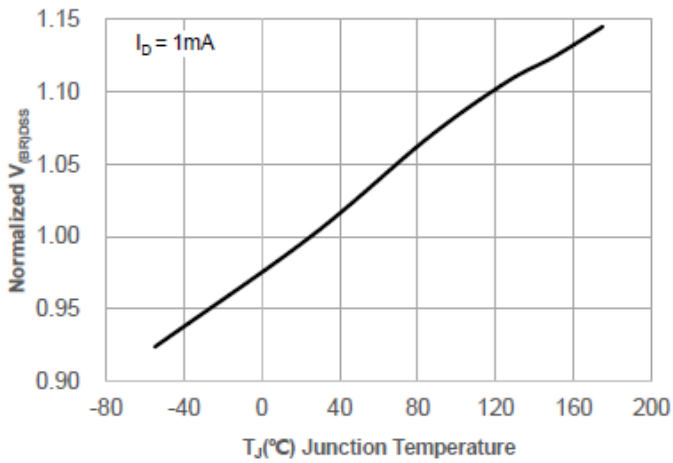


Figure 11: Normalized Breakdown voltage vs. Junction Temperature

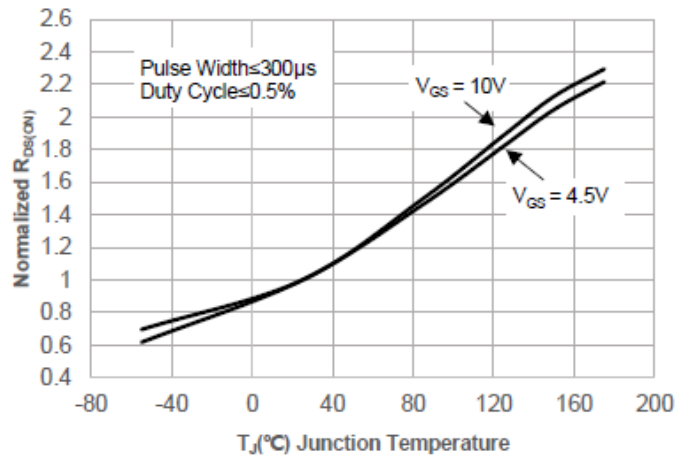


Figure 12: Normalized on Resistance vs. Junction Temperature

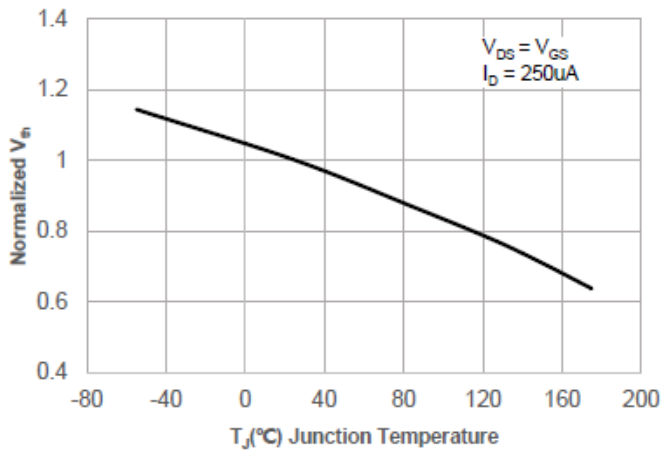


Figure 13: Normalized Threshold Voltage vs. Junction Temperature

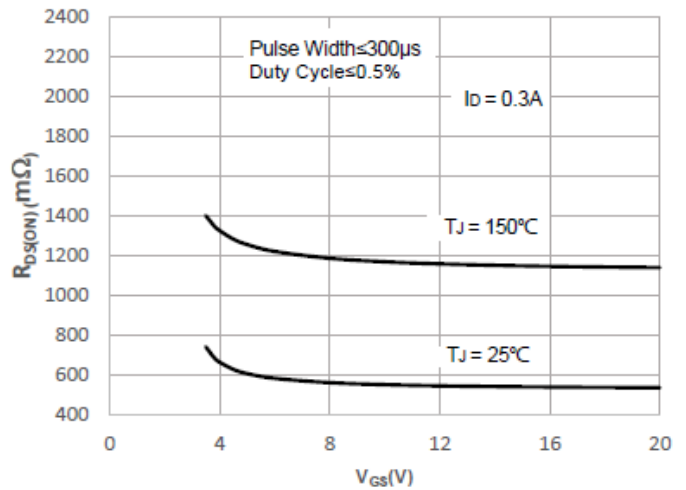


Figure 14:  $R_{DS(ON)}$  vs.  $V_{GS}$

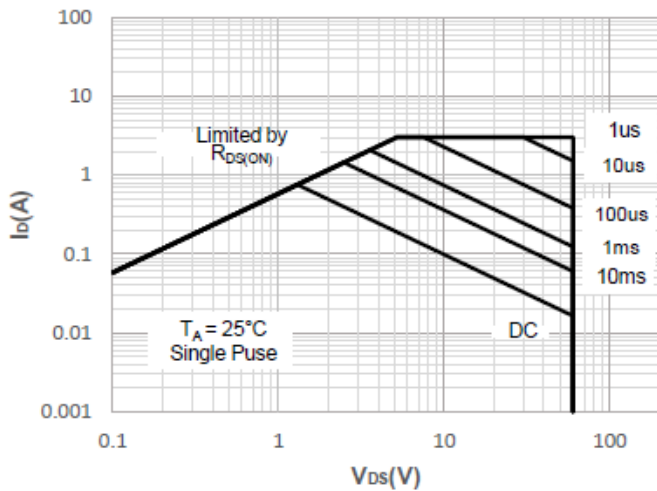
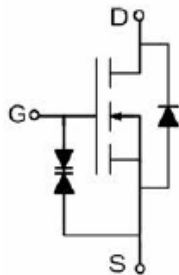
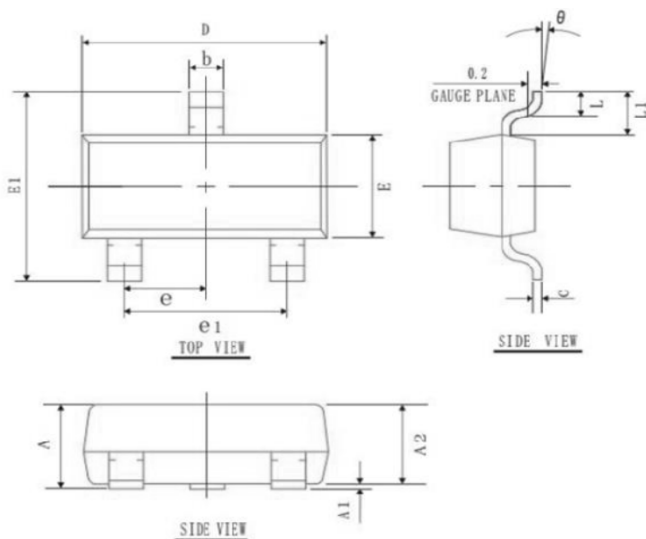


Figure 15: Maximum Safe Operating Area

- Circuit diagram



- Package outlines :



COMMON DIMENSIONS  
(UNITS OF MEASURE=mm)

SYMBOL	MIN	NOM	MAX
A	0.90	1.05	1.20
A1	0.00	0.05	0.10
A2	0.90	1.00	1.10
b	0.30	0.40	0.50
c	0.08	0.10	0.15
D	2.80	2.90	3.00
E	1.20	1.30	1.40
E1	2.30	2.40	2.50
L	0.30	0.40	0.50
$\theta$	0°	5°	10°
L1	0.55 REF		
e	0.95 BSC		
e1	1.90 REF		

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